

Asian Species of Hyphaene

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ABSTRACT

In this study two species of Hyphaene are described as new: one from Israel (**H. sinaitica**) and the other from Ceylon (**H. taprobanica**); both these are referred in previous literature as **H. thebaica**. The correct name of the third species, **H. indica**, is shown to be **H. dichotoma** (White) Furtado; this is common in the north west coast of India. A fourth species (**H. reptans**) has been recorded from the mountains of Arabia and has a flat, trailing stem which branches but the fruits are unknown.

It was generally believed that the genus Hyphaene was exclusively African so that any species found in Arabia and in other parts of Asia were regarded as introduced from Africa and acclimatized in Asia. Since all the adult species from the regions outside Africa had branched stems, they were all referred to as *H. thebaica*, a name that is still being widely but erroneously used to denote also any African species that has a branched stem. Thus about the year 1883 Haeckel (*A Visit to Ceylon*, ed. Engl.: 180 (1883)) noticed a species of Hyphaene growing in the Botanic Gardens, Peradeniya, Ceylon and found that both its vegetative characters and the flowers and fruits were so remarkably different that it should not be called *H. thebaica*. The palm however produced a branched stem and information obtained at the Gardens showed that attempts had been made to introduce *H. thebaica* from Egypt, though apparently there was nothing to show that the palm growing at Peradeniya was actually from the seed obtained from Egypt. The extant records are not of any value to determine this now. From an analogy, I might cite a case from the Botanic Gardens, Singapore. Here, too, attempts were made to acclimatize Hyphaene nuts from Egypt and India; but the branched Hyphaene growing in the Gardens, though labelled "*H. thebaica* — Egypt", is actually *H. dichotoma* (*H. indica*).

To return to the Peradeniya plant, Haeckel wrote such a glowing account on the ability of *H. thebaica* to alter its materially important characteristics in response to changes in the environments or climate so as to discourage any systematic inquiry. No doubt Beccari (*Engl. Jahrb.* 38: 8 (1906) & *Agric. Colon.* 2 (3): 15 et seq (1908) & *Borasseae* 23 et seq (1924)) had shown that, besides *H. thebaica*, there are several other species which have dichotomously branched stems, and that true *H. thebaica* is a species restricted in its distribution from the mountains of the Sudan where the Nile originates to the lower regions along the

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Nile up to 27° Lat. N. and not to the seashore of the Mediterranean or the Gulf of Suez or the Red Sea, where there are many other branched species which cannot be said to be in any way closely related to *H. thebaica*.* Similarly Beccari reported other branched-stemmed species from the regions of North West Africa and the Gulf of Guinea. Nevertheless, Haeckel's view on the fantastic ability of *H. thebaica* to change fundamental characters in response to the changes in environments has become current even in modern books (e.g. Taekholm & Drar, Fl. Egypt 2: 279 (1950) & McCurrah, Palms of the World: 104 (1963)). To get a precise idea of Haeckel's views, the following particulars are taken of "*H. thebaica*" as given by Blatter (Palms Brit. Ind. & Ceyl.: 157 (1926)), with a proviso that so far I have not found any true *H. thebaica* grown in India or Ceylon.

CULTIVATION IN INDIA: — Old specimens of the Egyptian Doum Palms may be seen in many a garden in India and Ceylon, and, as a rule, they are much better developed than the tree growing in Egypt. The climate seems, indeed, to exercise a great influence upon the development of this palm. When Haeckel (1883) saw the Doum Palm in Ceylon he was surprised to find it there under an aspect so altered that he could scarcely recognize.

"Adaptation," he says, "to perfectly different conditions of existence have made the Doum Palm of Egypt quite another tree in Ceylon. The trunk is developed to at least double the thickness, much larger than in its native land; the forked branches are more numerous but shorter and more closely grown; the enormous fan-leaves are much larger, more abundant and more solid; and even the flowers and fruit, so far as my memory served me, seemed to be finer and more abundant. At any rate, the whole habit of the tree had so greatly changed in the hot-house climate of Ceylon that the inherited physiognomy of the tree had lost many of its most characteristic features. And all this was the result of a change of external conditions and consequent adaptation, more particularly of the greater supply of moisture which had been brought to bear, from its earliest youth, on a plant accustomed to the dry desert climate of North Africa. These splendid trees had been raised from Egyptian seed, and in twenty years had grown to a height of thirty feet."

Since *H. thebaica* has a very limited distribution in nature even in Egypt itself, the identity of the species reported from Arabia and elsewhere outside Africa as referred to the Egyptian species becomes a problem of first importance. Beccari (1908 & 1924) made an attempt to identify them but was handicapped for lack of fruiting specimens. However, he was able to determine one species growing in the island of Diu on the north west coast of India; he named it *H. indica*. The situation has not improved very much, except that here two more new species from Asia are added. The three species recorded here appear to be allied to a group of African species or subspecies classified by Beccari under *H. multiformis*, but generally the epidermis in the fruits of the latter taxa seem to be wrinkled and not discoloured into a network of lines nor partly rimulose as in the Asian ones.

* Mahmood Ahmad Abu-Alula reports recently the occurrence of individual trees (parts of Saudi Arabia) and pure stands (Sudan and The United Arab Republic).

Enumeration of the Species

1. *Hyphaene dichotoma* (White) Furtado **comb. nov.**

Borassus dichotoma (dichotomus) White in Graham, Cat. Pl. Bombay: 226 (1839); Mart., Hist. Palm 3 ed 2: 318 (1850): **basinym. Figure 1.**

B. flabellifer sec. in Hk. f., Fl. Brit. Ind. 6: 482 (1893) quoad syn *B. dichotoma*.

H. coriacea sec. Dalziel & Gibs., Bomb. Fl. Suppl.: 95 p.p. (1861).

H. indica Becc. in Agric. Colon. 2, fasc. 3: 173 t.3 fig. (1908) et Borass.: 30 t.20 figs. 3-3' & t.28 (1924): Blatter, Palms. Brit. Ind. & Ceyl.: 187 tt. 33 & 34 & fig. 24: (1926): **syn. nov.**

H. thebaica sec. Cooke, Fl. Bomb. 2: 811 p.p. (1907).

Beccari (1908) gave details of this species under *H. indica* describing the fruit as obovate-pyriform and giving an illustration of its longitudinal section; it could not therefore be allied to *H. thebaica* though it was long regarded to be that species introduced in Cutch in Gujarat. If the species is not really an indigenous but an introduced palm in India, Beccari suggested searching for its original parent in Arabia especially in Oman where, according to reports noticed by Martius, similar palms were seen growing by ancient travellers. Later Beccari (1924) showed that the Indian species is allied to *H. macrocarpa* (Becc.) Furtado (= *H. multiformis* subsp. *H. macrocarpa* Becc.) from infra-equatorial east Africa.

INDIA: Island of Diu and Ahmedabad in Gujerat.

The protologue of *H. dichotoma* given under *Borassus dichotomus* is as follows:

“Oka-mundel, covers the whole of Diu Island and is also found in various parts of Goozerat. Mr. Vaupel.

A solitary tree grows on a Hill at Mazagon [Bombay], and it is branched like the Doum Palm. The fructifications have not been examined. See a sketch of the tree, Madras Journal of Science. N.”

Now, Hooker (1893) and others regarded this species to have been based on an abnormal branching of *Borassus flabellifer*; he therefore reduced the former to a synonym of the latter. However, the phrase “it is branched like the Doum Palm” should be taken to mean that the palm produces (perhaps repeatedly) dichotomous branches as in the Doum and one should not expect abnormal branching (if such were really the case) to occur uniformly in all the palms from the Diu Island and from the various parts of Gujarat. Martius (1850) who accepted the species as new remarked that the palm in Bombay was brought by Parsis from Gujarat and could easily be distinguished from *B. flabellifer*. Besides, monstrous branching in the latter species, he stressed, was irregular and is rare even on the Coromandel of India, where the

species is common. Martius added a new locality, Admedabad (also in Gujarat) where Baron von Hugel (Car. = a misprint for Bar.) had collected the specimens.

Gammie (fide Beccari) suggested that this species occurred as far south as Goa and Blatter 1926 published a plate of a palm growing at Bassein north of Bombay.

2. *Hyphaene taprobanica* Furtado spec. nov.

H. thebacia sec. Haeckel, A Visit to Ceylon, ed Engel.: 180 (1883); Becc., Borasseae: 24 t 13 (1924); Macmillan, Trop. Plant. & Gardening: 161 t. (1935); Blatter, Palms Brit. Ind. & Ceyl.: 165 (1926); Taeckholm & Drar, Fl. Egypt 2: 279 (1950); McCurrah, Palms of the World: 104 (1960): omnino pro parte zeylanica.
Figure 2, Plate 1.

Ab *H. dichotoma* cui affinissima, fructibus obovato-oblongis, dorso paulo ventricosis cum sarcocarpio osseoso multo tenuiore quam putamen paulo majore, ovoideo-oblongum vel ovatum, in uno latere magis convexum apice rotundatum, basi fere truncatum sat distincta.

Caulis iterum iterumque dichotomus, cum ramis primis a basi ejusdem modice remotis. *Fructus* obovate oblongus, dorso magis convexus, vertice in perimetro stigmatico-pedunculari depressiusculus, ventre obscure carinatus ad basin carpellis duobus sterilibus plerumque conspicue tuberculatus, circa 7 cm. altus, 5.5 cm. latus, 4–4.5 cm. crassus, epidermide nitidus, obscure tessellatus, partim irregulariter rimulosus. *Sarcocarpium* in parte fibrosa 4.5–7 mm. crassum, in parte osseosa 2–3 mm. crassum. *Putamen* ovoideo-oblongum vel ovatum, basi rotundato-truncatum uno latere magis convexum, vertice late rotundatum. *Albumen* conforme, pariete 7–8 mm. crassum, embryone carens.

ZEYLONA: probabiliter indigena, in locis supralittoreis. Cult. in Horto Botanico, Peradeniya, feminea tantum (Tissera: June 1969, K, holotypus).

All the fruits, even the very young ones, have the same shape, being much ventricose on the dorsal side and slightly carinate on the ventral side which is taller at the apex and bears two knobs of the vestigial carpels at the base. The epidermis is at first nitid and partly dark brown, but later it is almost dark and opaque, tessellately marbled all over and cracked in parts. Like *H. sinaitica* and *H. dichotoma*, this appears to be a coastal species and so the external characters regarding the colour of the fruit might be abnormal and the effects of the cold mountainous climate of Peradeniya.

Beccari's t.11 attributed to *H. thebaica* shows a very variable habit as in the members of the "*H. multiformis*" group. Some plants are branched at the ground level, others higher up. There is one that has not branched at the base but instead has a very thick stem and a few short and stout branches higher up—a phenomenon also noticed in the Ceylon plants, though this is totally different

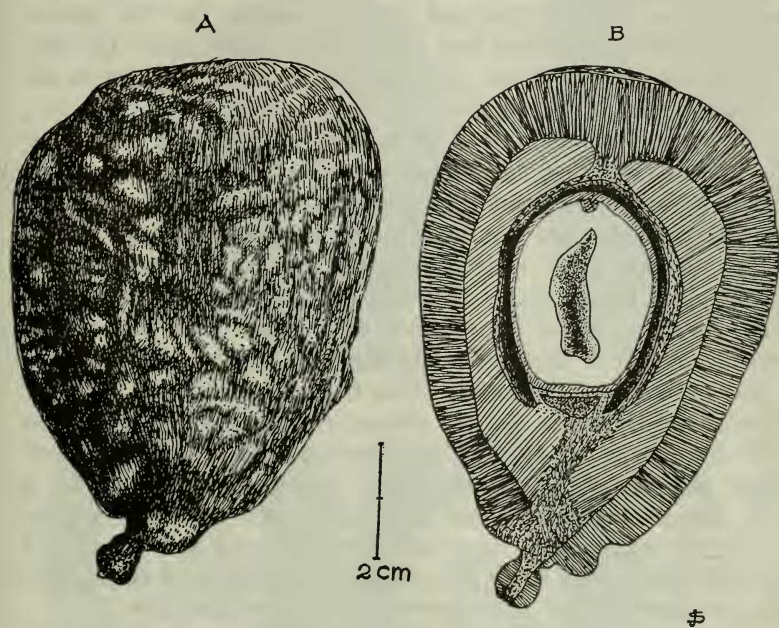


Fig. 1. *Hyphaene dichotoma* (White) Furtado (*H. indica* Becc.)
(Ex Ic. Beccariana in Borass. t. 20 figs. 3 & 3').

from the Egyptian species as illustrated by Beccari. In the absence of fruits I have assumed that all Ceylon plants are specifically identical. The solitary plant from the Peradeniya Gardens has not branched at the base but has bifurcated several times higher up.

When Dr. J. C. Willis, former director of the Botanic Gardens, Peradeniya, provided in 1908 a male specimen from Jaffna to Beccari in Italy with the information that the species was introduced by the Peradeniya Gardens from Egypt but that it had then become diffused on the island; he was obviously acting on the long current belief of the staff of the Gardens that the species is *H. thebaica* introduced into the Gardens from Egypt (cf. also Haeckel op. cit. 1883), but the species is in no way related to the Egyptian plant. I am inclined to believe that the species is a native of the sea-coast of Ceylon, and is introduced into Peradeniya. The fact that Peradeniya in all these years has only one female palm which, being dioecious, has not produced nuts with an embryo hence are not viable, and that formerly the species seems to have been widely distributed along the sea-coast of Ceylon (e.g. Jaffna, Galle, Colombo, Batticaloa, etc.) favour my view. As noted in the introduction there might have been unsuccessful attempts to acclimatize the Egyptian species in Ceylon.

Due to the mistaken identity of the Ceylon species as *H. thebaica*, Haeckel (1883) wrote, as said above, a glowing account to show that this species readily evokes numerous changes in the habit, shape and size of flowers and fruits. Though as early as 1908 & 1924 Beccari had shown that *H. thebaica* is a misnomer applied to several species from Egypt and elsewhere and had described a new *Hyphaene* from India, the fantastic adaptability of *H. thebaica* has, as shown above, been quoted even in modern books.

Beccari (Agric. Colon. 2, (3), 177 (1908)), who had examined the leaves of both *H. dichotoma* and *H. taprobanica* (the latter from a male specimen from Jaffna) noted that the leaf of the Ceylon plant had a greater number of segments which were also much shorter, the lamina being less deeply divided and very much lepidote on both the surfaces. Further, the male spadix was more robust and longer than 1 m., but the spathes were glabrous in the lower parts and fugaciously furfuraceous above (not densely tomentose as in *H. dichotoma*), their tips broadly triangular and longer than the respective axillary branch, the spikelets being inserted at the mouth of the spathe, and each branch bearing generally five spikelets (in *H. dichotoma*, the spikelet-bearing branch is very much longer than its axillant spathe). Apparently the same spadix was later mistaken by Beccari as having come from the Botanic Gardens in Peradeniya and was described and illustrated as of *H. thebaica* in Borasseae 24 t.13 (1924).

Since fruits were lacking in the specimen, Beccari could not decide whether the Ceylon *Hyphaene* represented a new species quite distinct from the region of Cutch or another i.e. one already known.

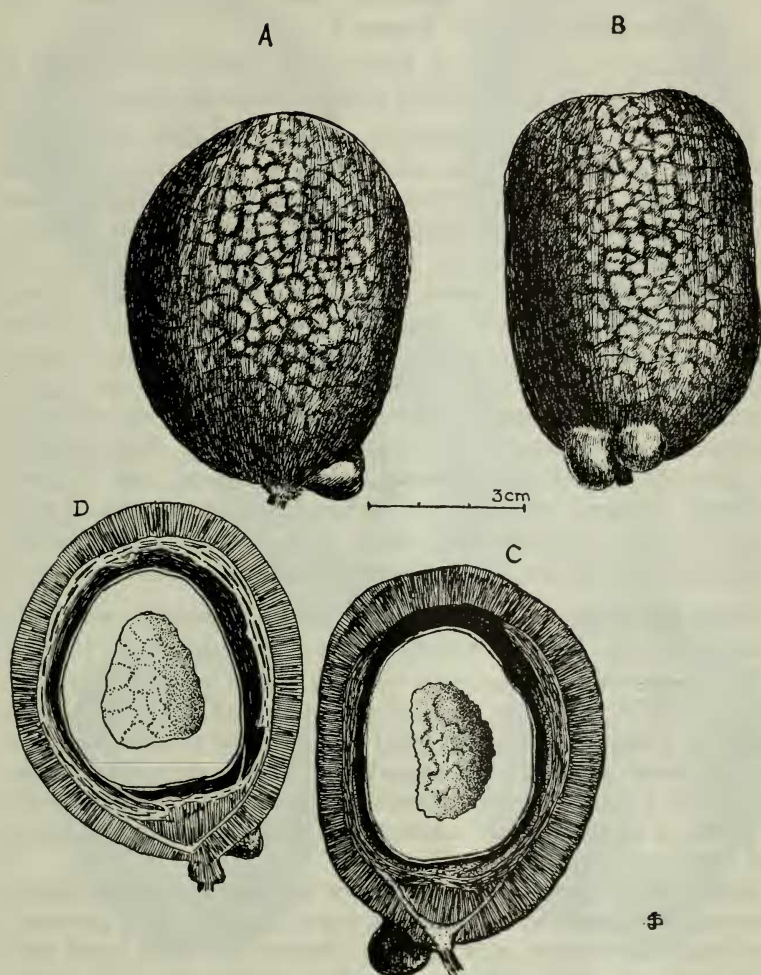


Fig. 2. *Hyphaene taprobanica* Furtado (ex collectione fructuum holo-
typica)

A: Fructus latere visus. B: Idem ventre visus. C & D: Sectiones
verticales duorum fructuum.

3. *Hyphaene sinaitica* Furtado spec. nov.

H. thebaica sec. Mart. Hist. Palm. 3: 22 (1849); Hart. Fauna & Flora of Sina, Petra & Wady 'Arabah': 9, 28 & 111 (1891); Zohary, Arb. Flor. Israel & Transj. in Imp. For. Inst., Oxford, Paper 26: 12 (1951); Tomlinson, Anat. Mon. 2 Palmae: 158 (1961) omino pro parte. **Figure 3.**

H. coriacea ? sec. Busse in Karst. et Schenck, Veget. Bildr. 5 ser. fasc 7 t.44 (1907) quoad palmas austro arabicas.

Ab *H. dichotoma*, cui affinissima, fructibus dimidio minoribus, ambitu irregulariter obovato-oblongis et in sectione transversa tetragonoideis, vel apicem versus compressis fere bifacialibus ambitu obovatis, cum epidermide fragili partim discolore lineata, paulo rimulosa, et sarcocarpio osseoso multo tenuiore differt.

Caulis dichotomus. Fructus circa 5 cm. altus, 4.5 cm. latus, 4–4.5 cm. crassus, nitidus, atro-bodius, obovato-oblongus, ventre obscure carinatus et plus minusve porcatus, interdum apicem versus sensim angustatus, sectione transversa tetragonoideus vel tetragonoideo-bifacialis, cum epidermide partim fracta et retiforme marmorata aut delapsa, etiam profunde rimulosa. *Sarcocarpium* in parte fibroso 6–8 mm. crassum; in parte osseosa circa 2 mm. orassum. *Putamen* ovatum, basi oblique truncatum, circa 3 cm. altum, 2.5 cm. in diam. cum pariete 1.5–2 mm. crasso. *Albumen* conforme, cum pariete 5–7 mm. crasso; embryo apicalis.

PALESTINA: Wadi Tabbā, ad versus meridiem a Eileth (Goldring — sn. 15–5.69, holotypus, K).

This palm was first reported by Hart (1891) from Aqaba, but Zohary (1951) found the species near the road between Aqaba and Um Rashrash. Later he noted several trees of different ages at 8 km north of Aqaba and remarked: "This is the northernmost station of a tree so widely distributed in tropical regions. Here it grows at approximately sea-level, on alluvial, somewhat saline soil and ripens normal fruits."

Here again there is a faint echo of Haeckel's view regarding mercurial changeability of the characters of *H. thebaica* in response to climatic conditions, although the climate in Aqaba could not have been very much different from that in some parts of Lower Egypt where the species has a restricted distribution. The fruit of *H. thebaica* is always conspicuously carinate, broadly truncate at the base and much narrowed towards the apex. Its epidermis is light brown or spadiceous and remains intact. In *H. sinaitica*, on the other hand, the fruit is obovate and obscurely carinate, with its epidermis dark brown and partly discoloured in lines so as to give it a net-like appearance. In addition it cracks in parts rather deeply in dry sarcocarp.

Martius, relying on the reports of several travellers, remarked that *H. thebaica* occurred in several parts of Arabia in Sinai, along the West coast Arabia (Yambu, Medina, etc.) and also in Oman. Blatter recorded the species from Shaik Othman in Aden, and Busse suspected the species from South Arabia to be *H. coriacea*.

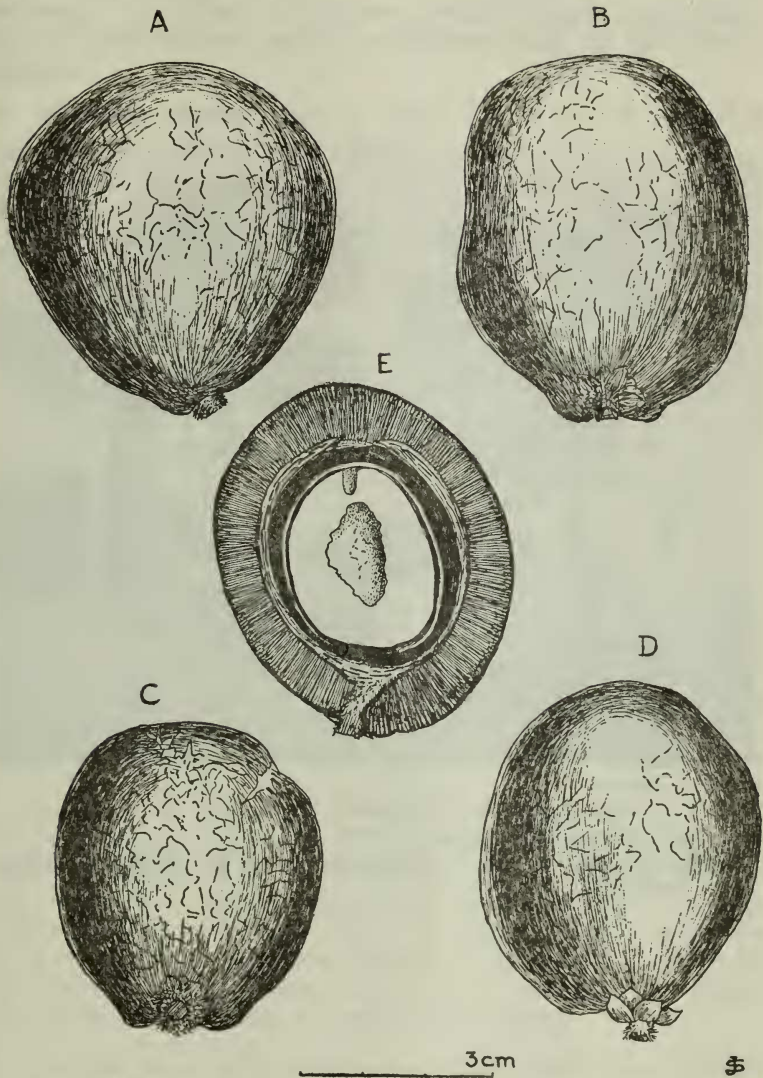


Fig. 3. *Hyphaene sinaitica* Furtado (ex collectione fructuum holotypica)
 Fructus diversi, forma variabiles, omnes obovoidei, basin versus tetragonoidei, apicem versus plus minusve plerumque compressi, parte compressa nunc dorso, nunc ventre, nunc latere, vel rarius dorso ventrique obscure sita.



Plate 1 *Hyphaene taprobanica* Furtado

Plants growing at Batticaloa, Ceylon.

(Photographed by Mr. I. Balachandran of St. Michael's College, Batticaloa).

Though from geographical considerations these records may be for *H. sinaitica*, the possibility of the existence of more than one species* should not be excluded; for unless the species is widely distributed through the ocean currents, isolation in habitat tends to produce local forms in *Hyphaene* species. There is a need therefore to study the specimens from different places on the coast of Arabia.

4. *Hyphaene reptans* Becc. in Agric. Col. 2 (3): 151 (1908) & Borasseae: 49 t.45 fig 6 (1924).

SOUTH ARABIA: Wadi Hadiea, Hadramaut, alt. 400 m. (Lundt — K); Abrial, alt. 650 m. (Lundt — K).

The palm is said to have a trailing stem which is flat on two sides and branches. From the ligule (hastula) the illustrated leaf which is thought to be of an adult plant appears to be juvenile. Fruit is not known.

However, *H. dankaliensis* var *haycockensis* Becc. (Borass: 29 (1924)) is from the Haycock island in the Red Sea on the side of South Arabia. Its stem is reported to be 4–5 cm. high. *H. reptans* might be allied to this, but the nature of the stem of the latter is not known.

Acknowledgements

It is my pleasant duty here to thank the Director, Botanic Gardens, Kew, England, for the loan of the specimens from the herbarium and for the photocopy of the original description of *Borassus dichotomus* — the basynym of *H. dichotoma* (White) Furtado; to Dr. C. C. Heyn, Botanist of the Jerusalem University, Israel, for obtaining *Hyphaene* fruits from Wadi Tabbā in the Gulf of Aqaba, the type of *H. sinaitica*; to Mr. Maxwell Tissera, a student at the University of Ceylon, for obtaining nuts of the Peradeniya palm, the type of *H. taprobanica*, and also photographs and information of the same and other palms recorded here; to Mr. Mahmood Ahmad Abu-Alula, Director of The Technical Office of The Agricultural Affairs in Jeddah (Saudi Arabia) for fruit specimens, photographs and notes of *H. thebaica*; and to the Director, Botanic Gardens, Singapore, for providing me library and herbarium facilities to make these studies.

* A supply of *H. thebaica* fruits arrived lately, indicating the occurrence in Saudi Arabia.